ESTIMATING FUNCTIONS FOR CONDITIONAL INFERENCE: MANY NUISANCE PARAMETER CASE

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(Received January 5, 1990; revised June 10, 1991)

Abstract. When there is a complete sufficient statistic for the nuisance parameter which depends on the parameter of interest then there are locally optimal unbiased estimating functions, but generally there is no globally optimal estimating function. We consider conditioning on the minimal sufficient statistic for the nuisance parameter and find the conditional linear optimal unbiased estimating function. Since the nuisance parameter is totally eliminated in the conditional model there is no intrinsic problem in setting up conditional tests of significance and confidence intervals. A compromise between conditional and unconditional optimum estimating functions is suggested. The techniques are illustrated on three examples including the well known common means problem. The proposed hypothesis testing and confidence interval procedures work reasonably well for the examples considered.

Key words and phrases: Common means problem, conditional inference, confidence interval, estimating function, hypothesis testing, Fisher information, stratified model.